

Effect of Gum Chewing on Intestinal Functions after Gynecological Operations: A Randomized Controlled Study

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ABSTRACT

OBJECTIVE: We aimed to assess the efficacy of gum chewing on intestinal functions after gynecological operations.

STUDY DESIGN: A total of 86 women who underwent gynecological operation with different indications were randomly assigned to 2 groups: Group 1 was assigned to gum chewing after operation (n=52), while Group 2 was directed to routine postoperative care (n=52). Time of first bowel sound and defecation after surgery were recorded to assess the effect of gum chewing. Operation time, blood loss, type of incision, pre and postoperative serum hemoglobin levels were all evaluated.

RESULTS: There was no difference between groups in terms of age, duration of operation, intraoperative blood loss, pre and postoperative serum hemoglobin levels, duration to first bowel sound, flatulence and defecation ($p>0.05$). Age ($r=0.234$, $p=0.032$), type of incision ($r=0.228$, $p=0.037$) were significantly correlated with the time to first bowel sound. Type of incision ($r=0.295$, $p=0.006$), duration of operation ($r=0.277$, $p=0.01$) and intraoperative blood loss ($r=0.298$, $p=0.006$) were significantly correlated with the time to first flatulence. In multivariate regression analyses, none of the variables were found to be significant parameter for time to first bowel sound ($p>0.05$).

CONCLUSION: Gum chewing does not affect some of the gastrointestinal functions after gynecological operations and there is no single parameter for time to first bowel sound, first flatulence and first defecation, individual surgical and medical condition differences should be kept in mind while evaluating intestinal functions.

Keywords: Gum chewing, Bowel function, Gynecological operations

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Introduction

Following an abdominal surgery, a transient non mechanical blockage of small and large intestine can be seen as an important postoperative problem (1). Frequency of postoperative ileus was reported to be 10.3% after an abdominal surgery (2). Ileus is determined in case of unrecovered intestinal functions after 3rd to 5th postoperative day following an abdominal surgery (3). Normalization of intestinal functions can be indirectly verified by declaration of flatulence and defecation by the patient (4). Recovery of intestinal function decreases postoperative hospitalization length and abdominal tenderness, also provides earlier oral intake (5). Decreased length of hospitalization lead to reduction in the rates of hospital infections, risk of deep vein thrombosis and the cost (6). Pathogenesis of ileus is multifactorial and several factors have been identified

for ileus development. Opioid treatment during surgery and severe visceral manipulations may also increase the risk of ileus (7,8). On the other hand, a dysfunctional parasympathetic activity may be the underlying abnormality (6). In order to prevent postoperative ileus, some interventions have been proposed to be used, including appropriate analgesic use, epidural anesthesia, gum chewing, laparoscopic surgery, metoclopramide, erythromycin, neostigmine, alvimopan administration, nasogastric decompression, intravenous fluid infusion and early enteral feeding (6,9). Gum chewing has been shown to be effective to prevent postoperative ileus after cesarean section (10). However, there is not enough number of randomized studies or meta-analyses to assess the effectiveness of gum chewing after gynecologic operations (11). In this study, we aimed to evaluate the effectivity of gum chewing on intestinal functions after gynecological operations in a randomized manner.

Material and Method

Between February 2015 and August 2015, totally 104 women who underwent gynecological operations with different indications in Department of Obstetrics and Gynecology in Zeynep Kamil Women and Children's Health Training and

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Research Hospital were randomly assigned into 2 groups: Group 1 was assigned to gum chewing (n=52), while Group 2 was directed to routine postoperative care without chewing (n=52). Randomization was performed by using computer program (Clinical trials registration number: NCT02455739). Flow chart of the study population was shown in Figure 1. Sample size was calculated according to the study by Ledari et al with 95 % confidence interval and 80% statistical power (12, Epiinfo). Study protocol was approved by the Zeynep Kamil Women and Children's Health training and Research Hospital Ethics committee (Approval number: 34/2015) and signed informed consent was obtained from each participants. Time of first bowel sound after surgery first flatulence and first defecation were recorded to assess the effect of gum chewing. Operation time, intraoperative blood loss, type of incision, pre and postoperative serum hemoglobin levels were all evaluated. Eligible women for gum chewing after gynecologic surgery were included in the study. Exclusion criteria were previous gastrointestinal intervention, previous abdominal surgery, history of drug consumption, water and electrolyte disturbances, pancreatitis or peritonitis, no willingness to cooperate, inability to chew gum, intra- and post-operative complications. hypothyroidism, and muscular or neurological disorders. Incision types were divided into three groups as; sub umbilical midline vertical and sub or supra umbilical midline vertical incisions. Age, body mass index, indication of surgical intervention, pre and postoperative blood cell counts, type of surgical intervention, duration of operation (minutes), intraoperative blood loss were all recorded for each participant. Body mass index was calculated by the formula: Weight/height², duration of operation was calculated as minutes from first incision to fascial closure by stop watch. Blood loss was calculated by the sum of 60 ml per small soaked swab (10x10 cm), 350 mL per large soaked swab (45x45 cm) and volume in reservoir of surgical aspirator. Study group was prescribed the sugar-free gum after recovery from anesthesia three times a day, for each time subjects chewed gum for one hour, until first bowel sound detected by auscultation. Data was collected by questionnaires, and the physical examination of subjects. All patients were requested to mention the time of the first

bowel movement, passage of flatus and defecation. An independent medical staff who was unaware of the study protocol, visited the patients for every hour, and recorded. Groups were compared in terms of time to first bowel sound, flatus and defecation to determine the effect of gum chewing on gastrointestinal functions after gynecological operations. Patients were diagnosed as sub ileus who did not experience flatus within the first 24 hours of postoperative period (13).

Statistical Analyses

All data was entered to SPSS version 15 software for Windows (SPSS, Chicago, IL), descriptive analyses were used to show minimum, maximum and the mean levels, student-t test was used to compare means between two groups, correlation analyses was used to show degree of correlations between variables and multivariate analyses was used to show adjusted associations. A p value of less than 0.05 was considered statistically significant.

Results

Clinical and demographic characteristics of the study population were summarized in Table 1 and flow chart of the study was illustrated in Figure 1. There was no difference between groups in terms of age, duration of operation, blood loss, pre and postoperative serum hemoglobin levels, time to first bowel sound, flatulence and defecation ($p>0.05$). There was no significant difference between groups in terms of systemic disorder, type of incision and the indication of surgery ($p>0.05$) (Table 2,3). Age ($r=0.234$, $p=0.032$), type of incision ($r=0.228$, $p=0.037$) were significantly correlated with the time to first bowel sound. Type of incision ($r=0.295$, $p=0.006$), duration of operation ($r=0.277$, $p=0.01$) and blood loss ($r=0.298$, $p=0.006$) were significantly correlated with the time to first flatulence. In multivariate regression analyses, none of the variables were found to be significant parameter for time to first bowel sound ($p>0.05$). Also none of the variable was found to affect time to first flatulence ($p>0.05$). There were 11 (31.4 %) cases of sub ileus in study group, in the control group 19 (37.3 %) cases were noted ($p>0.05$). No ileus case was observed in the groups.

Table 1: Comparison of the two groups with regard to some clinical and demographic characteristics

	Control (n=51) Mean±SD	Chewing Gum (n=35) Mean±SD	p value
Age (year)	46.9±11.5	45.6±8.8	NS
BMI (kg/m ²)	28.2±5.1	29.5±5.2	NS
Preop Hb (gr/dL)	12.1±1.3	12.1±1.3	NS
Postop Hb(gr/dL)	10.7±1.4	10.4±1.1	NS
Blood loss (mL)	230.4±249	277.1±253.	NS
Bowel sound (hour)	6.08±1.8	5.59±1.8	NS
First flatulence (hour)	23.5±10.7	23.7±13	NS
Defecation time (hour)	47.9±20.9	45.6±18.7	NS

BMI: Body mass index, NS: Non significant

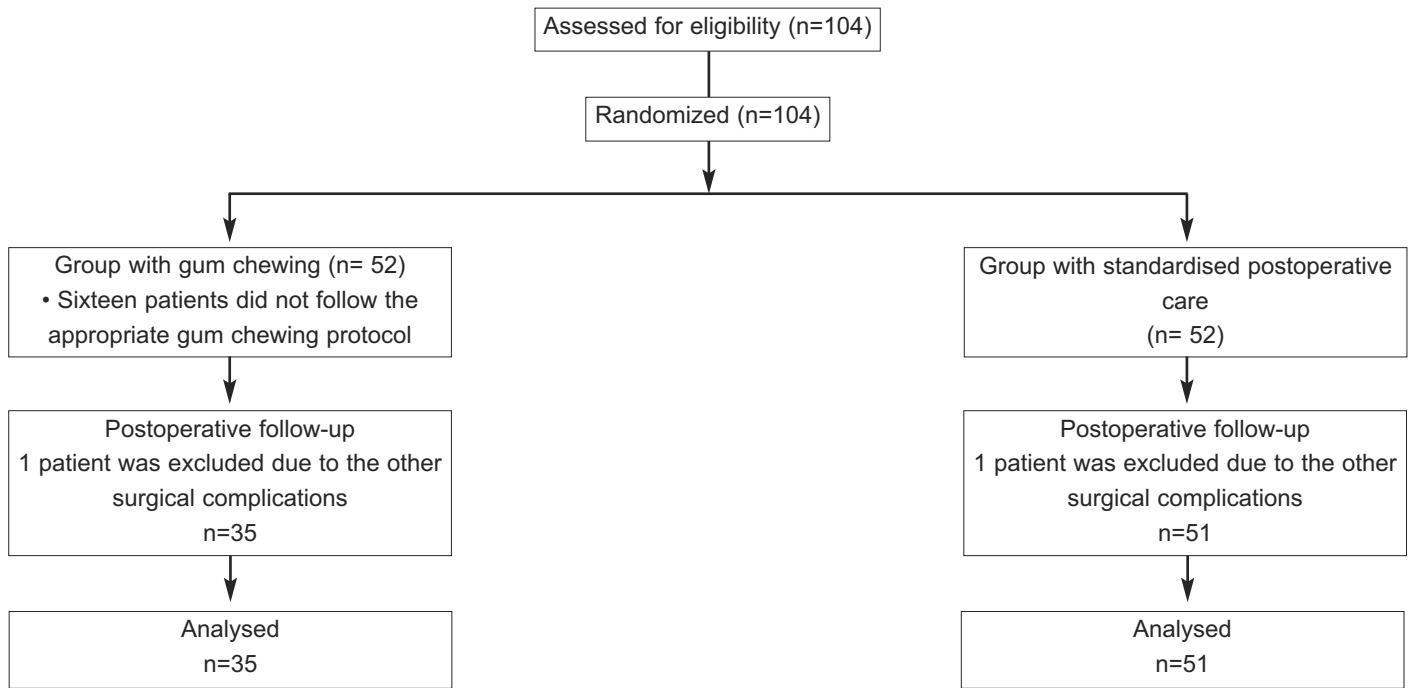


Figure 1: Flowchart of patients through the trial.

Table 2: Summary and comparison of type of surgeries between the groups

	Control Group (n)	Gum Chewing Group (n)
TAH	2	1
TAH+BSO	18	13
TAH+BSO+Burch	1	0
TAH+BSO+Omentectomy	1	0
TAH +BSO +PLND	1	1
TAH +BSO +PLND +Omentectomy	1	0
TAH+BSO+PPLND+Omentectomy	1	2
TAH+ Salpenjectomy	8	5
Type 3 Hysterectomy	1	1
Debulking	2	0
Frozen Pelvis	0	1
Cystectomy	3	1
Myomectomy	9	8
Salpingoopherectomi	1	0
Salpenjectomy	1	1
Tuboplasty	2	1
Total	51	35

TAH: Total abdominal hysterectomy, BSO: Bilateral salpingoopherectomy, PLND: Pelvic lymph node dissection, PPLND: Pelvic-paraaortic lymph node dissection

Table 3: Comparison of groups in terms of type of incisions

	Control Group	Gum Chewing Group	p value*
Pfannenstiell incision	33	26	>0.05
SUB-S-UM-VI	12	3	
SUB-UM-VI	6	6	
Total	51	35	

Chi square test $p < 0.05$, SUB -S-VI: Sub umbilical and supra umbilical vertical incision, SUB-UM-VI: Sub umbilical vertical incision

Discussion

Our data showed no difference between with or without gum chewing groups in terms of age, body mass index, duration of operation, pre and postoperative blood counts. Previous studies also compared groups for age, body mass index and the duration of operation (3,14,15). Additionally, previous studies showed the importance of surgical manipulation on postoperative intestinal functions (10,12,16). Generally, it is not expected to experience too much surgical manipulation during cesarean section. We conducted this study in a study population undergoing gynecological operations. Although we studied a heterogeneous group of surgeries, randomization and regression analyses helped us to overcome this drawback, so that we obtained an opportunity to assess the effect of type of surgical intervention and the incision. In our institution most of the time, ileus cases are observed among patients who underwent gynecological surgery rather than cesarean section, so in order to represent the whole population, we established a sample including different types of surgical interventions. We thought that, this sample is an appropriate reflection of our routine gynecological practice.

In our study indications of surgeries, rate of systemic disorders and type of incisions were similar between groups. According to previous studies, gum chewing was found to be effective to decrease time to first bowel sound, flatulence and the defecation after gastrointestinal surgeries (17-19). Safety and effectiveness of gum chewing in decreasing postoperative ileus and nausea have been shown in a previous study (15). However, our results did not show significant difference between groups in terms of time to first flatus and bowel movements. Gum chewing was also found to be beneficial on bowel movements after laparoscopic surgeries where the probability of manipulation was minimal (20).

In our study, no difference was observed between groups in terms of time to first bowel sound, flatulence and defecation, however, there was a significant correlation between the type of incision, duration operation, blood loss and the time to first flatulence. Negative effect of increased catecholamine, and, surgical manipulations on pacemakers, electrolyte imbalances, peritoneal irritations and analgesic substances have been proposed to be some of the factors that lead to intestinal malfunction as pathophysiological mechanism of postoperative ileus (21-23) furthermore elevated concentrations of some vasoactive peptides has been also proposed to have inhibitory effect on smooth muscle contractions in some studies (24), these data explain why we found a significant correlation between aforementioned variables. Blood loss and surgical stress may also be major causes of catecholamine discharge and electrolyte imbalance which were shown to be main contributors for postoperative ileus.

Conclusion

Gum chewing does not affect gastrointestinal functions

after gynecological operations and there is no single parameter for time to first bowel sound, first flatulence and first defecation. Further investigations are needed and individual surgical and medical condition differences should be kept in mind while evaluating intestinal functions.

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